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*Teacher Efficacy and the National Board for Professional Teaching Standards: Human Capital or Program Effects?*

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Education scholars know that having an effective teacher makes a significant difference in a student's life chances. By some estimates, the difference in learning outcomes between a highly effective and a very ineffective teacher is one full year (Hanushek, 1992; Hanushek 2011). Others note that the impact of a high quality teacher extends beyond the classroom: high quality teachers are associated with improved adult outcomes such as higher wages, increased college attendance and decreased teenage pregnancy (Chetty, Friedman, & Rockoff, 2014). Attracting, strengthening, and retaining top talent for our nation's classrooms is thus a key concern of federal, state, and district education policy.

While there is widespread agreement about the importance of teacher quality, however, it is still not entirely clear how to assess and improve teachers' capacities (Jackson, 2012). Of the traditional measures of teacher quality – experience, years of education, certification – only experience is consistently correlated with more effective teaching (Wayne & Youngs, 2003). Research on which models of teacher preparation move the dial is decidedly ambiguous: while some residency and alternative certification programs appear to be somewhat more successful than traditional programs, the variability in teacher efficacy is greater *within* programs than *between* them (Arnett, 2015; Kane et al., 2006; “New Findings”, 2015; Strategic Data Project, 2012). Assessing and improving teacher training programs remains a critical area for detailed study and innovation.

## National Board for Professional Teaching Standards: A Model of Improvement

The National Board for Professional Teaching Standards (NBPTS) offers a different solution: deepen the expertise and capacity of existing teachers. Created in 1987 to “recognize, develop, and retain effective teachers”, NBPTS seeks to improve teacher quality by defining rigorous standards for highly effective teaching and certifying teachers who meet those standards. (“About Certification”, 2016)

NBPTS offers certification in 25 specific areas, based on content and students' age. More than 110,000 teachers in all 50 states and the District of Columbia, or roughly 3% of America's current teachers, have earned the NBPTS certification. (“The Continuum”, 2016). In order to apply, applicants must have earned a bachelor's degree and state certification and have three years of teaching or school counseling experience. (“Getting Started”, 2016)

NBPTS certification itself consists of four components: (1) written assessment of content knowledge; (2) reflection on student work samples; (3) video and analysis of teaching practice; and (4) documented impact and accomplishments as a teaching professional. In order to

demonstrate mastery of these four components, teachers complete six computer-based exercises and submit a portfolio that includes written commentary, video recordings of classroom teaching, and student work. (“Getting Started”, 2016; “ePortfolio FAQ”, 2016)

The cost of certification is \$1900 and can take up to two years to complete, with a time commitment of several hundred hours (Sawchuck, 2015). Teachers who do not initially pass may resubmit the materials associated with the sections they failed. Once earned, certification lasts for 10 years, at which time teachers renew by submitting a Profile of Professional Growth, a process that the NBPTS estimates takes roughly 30 to 40 hours (with a success rate of approximately 90%). (“Renewal Process”, 2016).

## What are the effects of NBPTS certification?

The short answer is that the effects are elusive, but the program attracts strong talent. The research questions to ask are: Does the process of becoming certified through NBPTS make teachers more effective, or are those who are certified through NBPTS more effective to begin with? What are the benefits of NBPTS for districts and schools in terms of cost-effectiveness, student outcomes, and human capital?

In 2008, a meta-analysis of 11 studies was conducted by the National Research Council (NRC). The report found that NBPTS certification effectively *identifies* highly skilled teachers; that is, teachers with NBPTS certification are positively correlated with higher student learning outcomes. The NRC, however, called for further research across a wider variety of states and subject areas; the previous research had only used student data from elementary math and reading tests in Florida and North Carolina. Another NRC recommendation was to further investigate whether stronger learning outcomes from teachers with NBPTS certification could be attributed to the certification process itself or to the initial capacities of the teachers prior to NBPTS engagement. (“Committee on Evaluation”, 2008)

A new report addresses these vital questions. In *From Large Urban to Small Rural Schools: An Empirical Study of National Board Certification and Teaching Effectiveness*, (Cavalluzzo et al., 2014), the authors study English, math, and science test scores from high school students in the Chicago Public Schools and Kentucky. Cavalluzzo et al. also conducted classroom observations at the beginning and end of the NBPTS process, in order to assess its impact upon classroom practice.

Cavalluzzo et al. use test score data to try to answer three different questions:

- (1) Are National Board-certified teachers more effective than other teachers?
- (2) Are applicants who attain National Board certification more effective than applicants who do not?
- (3) What effect, if any, does the National Board *process* have on teacher effectiveness?

For the first question, Cavalluzzo et al.’s findings are in keeping with previous research: Nationally board-certified teachers are more effective on average than other teachers. The research team employed five different statistical models to estimate effects, which ranged from (-0.010 to 0.116)

for English, (0.004 to 0.205) in math, and (-0.015 to 0.304) in science, depending on the test, model, and location. The estimates can be interpreted as the number of standard deviations the test score would change when a student had at least one NBPTS certified teacher in the subject area between the pre- and post-tests. An estimate of 0.20 is roughly equivalent to 6 months of additional learning, and an estimate above this is considered large for an educational intervention (Hill et al., 2008; Strategic Data Project, 2012). All negative estimates are statistically insignificant and the majority of the estimates are positive and significantly different from zero. These estimates are consistent with earlier findings by Cavaluzzo, which found that NBPTS certification is an effective signal of higher quality teaching (2004).

In order to answer the second question (Are applicants who attain National Board certification more effective than applicants who do not?), the research team compares estimated effects of teachers who currently hold or will hold NBPTS certification with those who apply for certification, but fail to achieve it. If these estimates were statistically different, the authors posit, this would demonstrate that NBPTS is able to effectively distinguish between more and less effective teachers.

The authors' findings show mixed results that depend upon the test, model specification, and location. For example, in math, the authors find statistically significant differences between teachers who do and do not achieve certification for most of their specifications when using one test (PLAN), but not a different test (ACT). The opposite is true in Chicago; teachers who gain certification have statistically higher student achievement gains over teachers who fail to gain certification when student achievement gains are measured using the ACT test, but not the PLAN test. There is no evidence from Kentucky that NBPTS certification can distinguish better English and Science teachers, and again the evidence is mixed in Chicago depending on the test and specification of the model; most models show no statistical difference. These findings therefore lead to an inconclusive answer to the second question.

In order to answer the third question (What effect, if any, does the National Board *process* have on teacher effectiveness?), the authors evaluate NBPTS certified teachers throughout their process of gaining certification. If the National Board process itself causes teachers to be more effective, then the authors posit that teachers who have finished the certification process should be more effective than they were before they went through the certification process. However, the authors find no evidence of an effect on student achievement as teachers move through the NBPTS application process.

In order to understand how the NBPTS certification process might impact teaching, the researchers collected classroom observation data. The observations compare how the instructional practice of teachers seeking NBPTS certification changed over time, compared with similar teachers not seeking certification (the control group). Teachers were rated based upon a rubric designed from the Leadership by Design (LBD) classroom observation instrument, and all observers had employed LBD in previous studies. They conducted observations of NBPTS certification applicants three times: at the beginning, middle, and the end of the certification process, and at similar times for the control group. In total they observed 27 teachers three times (15 teachers who were applying for NBPTS, and 12 who were not).

The researchers then compare the teachers seeking NBPTS certification against the control group at the base-line, or beginning of the NBPTS application process. They find some evidence that, among math teachers, applicants had higher overall ratings than the control group. At a more granular level, when looking at nine subscales (e.g. classroom atmosphere, content knowledge, questioning, assesses learning), teachers who are seeking NBPTS certification are statistically better in six out of nine subcategories, at a 10% significance level. This means that for each of the six subcategories there is a 10% probability that the differences are in fact not present – providing evidence that NBPTS teachers were stronger to begin with. When comparing each teacher to his or her own base-line over time, there is no statistical difference in overall instruction from the first through third observation for either group. The results from the observations provide little evidence of changes to teaching practices due to the NBPTS certification process.

### Limitations of Cavalluzzo's report

Cavalluzzo et al.'s report advances our understanding of the effects of NBPTS certification. The research team supports earlier findings that indeed NBPTS-certified teachers are more effective than non-certified peers. The research team's assessment that the effectiveness is to be found in the strengths of the initial NBPTS cohort, not in the program itself, is provocative but not definitive, for two reasons. First, the study uses a relatively small sample sizes of teachers to answer their second and third questions. Sample size is particularly important because it is directly related with the power of their statistical tests, which is the probability that the null hypothesis (that NBPTS certification has no effect) is rejected, when the alternative hypothesis (that NBPTS certification has a positive effect) is true. When sample sizes are low, the probability that a positive or negative effect will be detected is lower. This is a particular problem for the third question (What effect, if any, does the National Board *process* have on teacher effectiveness?) and the teacher observations.

A second limitation of this research is the duration between when the pre- and post-tests were taken. In most cases, the time lapse was roughly one calendar year, although in some cases two school years passed between the pre-test and post-test. The researchers themselves noted the fluidity of teacher assignments, even within the same school year and subject; because students might not begin and end a year with the same teacher, connecting student scores and a single teacher proved problematic. Non-random matching of teachers and students could further exacerbate this problem, for example if students are given a teacher with NBPTS certification for the first semester and then a weak teacher the second semester.

Therefore, this report leaves us with a strong sense of the efficacy of teachers with the NBPTS certification, but a weak understanding of why.

### Future Research and Policy Perspectives

There is clear evidence from multiple studies that teachers with NBPTS certification produce better student outcomes. Harvard University's Strategic Data Project (SDP) estimates that teachers in Los Angeles with NBPTS certification increase student learning by an additional one or two

months as compared to their peers with similar experience (2012). The Cavalluzzo et al. report attempts to determine the role of the program itself, rather than the initial strength of the teachers involved, in such results. Cavalluzzo's work suggests that more effective teachers seek certification in the first place and finds little evidence that NBPTS either screens out less effective teachers or develops teacher efficacy. Because of the limitations of the sample size and their data, however, it is left to future research to clarify the effects of NBPTS certification more precisely and to assess the cost-effectiveness of the certification process.

In sum, given the current state of research, we know that teachers with NBPTS certification advance student learning. Districts and states can therefore have confidence that NBPTS certification provides a meaningful criterion for hiring and rewarding teachers.

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